UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,057	12/27/2001	Xiaomei Liu	CISCP276/5171	1825

22434 7590 04/20/2007
BEYER WEAVER LLP
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
PHUNKULH, BOB A	
ART UNIT	PAPER NUMBER
2616	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/034,057	LIU ET AL.	
	Examiner	Art Unit	
	Bob A. Phunkulh	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This communication is in response to applicant's 01/29/2007 amendment(s)/response(s) in the application of **LIU et al.** for "**EFFICIENT AVAILABLE BANDWIDTH USAGE IN TRANSMISSION OF COMPRESSED VIDEO DATA**" filed 12/27/2001. The amendments/response to the claims have been entered. No claims have been canceled. No claims have been added. Claims 1-22 are now pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-22 are rejected under 35 U.S.C. 102(e) as being anticipated by *WU et al.* (US 6,594,271), hereinafter *WU*.

Regarding claim 1, *WU* discloses a network device (statistical multiplexing) for transmitting compressed video data onto a channel, the network device comprising:

a bit rate converter designed or configured to transcode compressed video data from multiple bitstreams to produce multiple transcoded bit streams (the combination of encoders 115, 120, 125, provide multiple transcoded bit streams, see figure 1 and col. 1 lines 20-28);

a multiplexer designed or configured to (the combination of MUX 140 and the controller QLP 130, see figure 2)

a) schedule packets from the multiple transcoded bitstreams (QLP allocates bandwidth to encoders, see col. 2 lines 17-30);

b) determining if bandwidth is available on the channel prior to or after the multiple transcoded bitstreams have been scheduled by the multiplexer, and if so, allocating additional packets from the multiple transcoded bitstreams to use the available bandwidth on the channel after the multiple transcoded bitstreams have been scheduled by the multiplexer, and if not, to not allocate additional packets from the multiple transcoded bitstreams in the bandwidth that is available after the multiple transcoded bitstreams have been scheduled by the multiplexer (if spare bandwidth is available, QLP allocating the spare bandwidth, see col. 5 lines 52-56; see col. 5 lines 5-9); and

a network interface designed or configured to output data packets from the transcoded bitstreams onto the channel (the output of the packet multiplexer 140 shows as MPEG-2 transport stream, see figure 1).

Regarding claim 2, *WU* discloses the multiplexer comprises a bandwidth arbitrator that is designed or configured to divide the available bandwidth substantially equally among the multiple bitstreams (the controller allocates rates, col. 5 lines 53-56).

Regarding claim 3, *WU* discloses the bandwidth arbitrator periodically determines and allocates the available bandwidth on a temporal basis (each TSP periodically sends statistical information, see col. 5 lines 32-42; thus, the QLP determines the available bandwidth and allocates periodically available bandwidth, see col. 5 lines 52-56).

Regarding claim 4, *WU* discloses the bandwidth arbitrator periodically determines a decoder buffer level for each of the bitstreams (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; thus, the QLP determine the available bandwidth and allocates periodically available bandwidth, see col. 5 lines 52-56).

Regarding claim 5, *WU* discloses the multiplexer is designed or configured to alter the scheduling of packets according to the bit rate of incoming bitstreams (in statistical multiplexing, the bitrate are adjusted, see col. 5 lines 57-63).

Regarding claim 6, *WU* discloses a rate controller, coupled to the bandwidth arbitrator and the bit rate converter, and designed or configured to output a control signal that determines the amount of rate reduction when transcoding the compressed video data (in statistical multiplexing, the bitrate are adjusted, see col. 5 lines 57-63).

Regarding claim 7, *WU* discloses the processor is designed or configured to model downstream decoder buffer levels corresponding to each of the bitstreams (each

TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; thus, the QLP determine the available bandwidth and allocates periodically available bandwidth, see col. 5 lines 52-56).

Regarding claim 8, *WU* discloses the scheduler is included in a statistical multiplexer (see col. 2 lines 3-6).

Regarding claim 9, *WU* discloses a method for transmitting compressed video data onto a channel, the network device comprising:

receiving multiple bitstreams, each bitstream including compressed video data contained in packets (receiving multiple bits stream from sources 1-N, see figure 1);

transcoding the compressed video data from the multiple bitstreams to produce multiple transcoded bitstreams (the plurality of TSP produce multiple transcoded bitstreams, see figure 1);

scheduling packets from the multiple transcoded bitstreams (QLP allocates bandwidth to each encoders, see col. 2 lines 17-30);

determining an available bandwidth on the channel after the multiple transcoded bitstreams have been scheduled by the multiplexer (see col. 5 lines 52-56).

allocating additional packets from the multiple transcoded bitstreams to the available bandwidth on the channel after the multiple transcoded bitstreams have been scheduled by the multiplexer, and if not, to not allocate additional packets from the

multiple transcoded bitstreams in the bandwidth that is available after the multiple transcoded bitstreams have been scheduled by the multiplexer (if spare bandwidth is available, QLP allocating the spare bandwidth, see col. 5 lines 52-56; see col. 5 lines 5-9); and

transmitting data packets from each of the multiple transcoded bitstream onto the channel (see col. 5 lines 14-19; and see figure 1).

Regarding claim 10, *WU* discloses the available bandwidth is determined on a periodic basis (each TSP periodically sends statistical information, see col. 5 lines 32-42; thus, the QLP determines the available bandwidth and allocates periodically available bandwidth, see col. 5 lines 52-56).

Regarding claim 11, *WU* discloses the available bandwidth is periodically determined 25 on one of a temporal, bit or a packet basis (each TSP periodically sends statistical information, see col. 5 lines 32-42; thus, the QLP determine the available bandwidth and allocates periodically available bandwidth, see col. 5 lines 52-56).

Regarding claims 12, *WU* inherently discloses the available bandwidth is periodically determined about every 10 milliseconds to about every 250 milliseconds (each TSP periodically sends statistical information, see col. 5 lines 32-42; thus, the QLP determine the available bandwidth and allocates periodically available bandwidth, see col. 5 lines 52-56).

Regarding claim 13, *WU* discloses the available bandwidth is allocated according to a minimum bandwidth requirement for a downstream decoder (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; the QLP determine the available bandwidth and allocates periodically available bandwidth based on the received information, see col. 5 lines 52-56).

Regarding claim 14, *WU* discloses the available bandwidth is allocated inversely proportional to a downstream decoder buffer level (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; the QLP determine the available bandwidth and allocates periodically available bandwidth based on the received information, see col. 5 lines 52-56).

Regarding claim 15, *WU* inherently discloses modeling a downstream decoder buffer level corresponding to one of the multiple bitstreams (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; the QLP determine the available bandwidth and allocates periodically available bandwidth based on the received information, see col. 5 lines 52-56).

Regarding claim 16, *WU* inherently discloses the available bandwidth is allocated to a bitstream having a lower modeled downstream decoder buffer level than another bitstream having a higher modeled downstream decoder buffer level (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; the QLP determine the available bandwidth and allocates periodically available bandwidth based on the received information, see col. 5 lines 52-56).

Regarding claim 17, *WU* discloses the available bandwidth is allocated inversely proportional to a downstream decoder buffer level (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; the QLP determine the available bandwidth and allocates periodically available bandwidth based on the received information, see col. 5 lines 52-56).

Regarding claim 18, *WU* discloses the available bandwidth on the channel allocated proportional to the minimum bandwidth requirement of each downstream decoder buffer level (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; the QLP determine the available bandwidth and allocates periodically available bandwidth based on the received information, see col. 5 lines 52-56).

Regarding claim 19, *WU* discloses a network device (statistical multiplexing device, see figure 1) for transmitting compressed video data onto a channel, the network device comprising:

means for receiving multiple bitstreams, each bitstream including compressed video data contained in packets (receiving multiple bits stream from sources 1-N, see figure 1);

means for transcoding the compressed video data from the multiple bitstreams to produce multiple transcoded bitstreams (the plurality of TSP produce multiple transcoded bitstreams, see figure 1);

means for scheduling packets from the multiple transcoded bitstreams (QLP allocates bandwidth to each encoders, see col. 2 lines 17-30);

means for determining an available bandwidth on the channel after the multiple transcoded bitstreams have been scheduled by the multiplexer (see col. 5 lines 52-56).

means for allocating additional packets from the multiple transcoded bitstreams to the available bandwidth on the channel after the multiple transcoded bitstreams have been scheduled by the multiplexer, and if not, to not allocate additional packets from the multiple transcoded bitstreams in the bandwidth that is available after the multiple transcoded bitstreams have been scheduled by the multiplexer (if spare bandwidth is available, QLP allocating the spare bandwidth, see col. 5 lines 52-56; see col. 5 lines 5-9); and

means for transmitting data packets from each of the multiple transcoded bitstream onto the channel (see col. 5 lines 14-19; and see figure 1).

Regarding claim 20, *WU* discloses outputting a control signal that determines the amount of rate reduction when transcoding the compressed video data (see col. 5 lines 57-63).

Regarding claim 21, *WU* inherently discloses modeling a downstream decoder buffer level corresponding to one of the multiple bitstreams (each TSP periodically sends statistical information includes the minimum bit rate and maximum bit rate based on decoder's buffer level, see col. 5 lines 32-42; the QLP determine the available bandwidth and allocates periodically available bandwidth based on the received information, see col. 5 lines 52-56).

Regarding claim 22, *WU* discloses a computer readable medium storing computer executable instructions fro transmitting compressed video data onto a channel, the network device comprising:

instruction for receiving multiple bitstreams, each bitstream including compressed video data contained in packets (receiving multiple bits stream from sources 1-N, see figure 1);

instruction for transcoding the compressed video data from the multiple bitstreams to produce multiple transcoded bitstreams (the plurality of TSP produce multiple transcoded bitstreams, see figure 1);

instruction for scheduling packets from the multiple transcoded bitstreams (QLP allocates bandwidth to each encoders, see col. 2 lines 17-30);

instruction for determining an available bandwidth on the channel after the multiple transcoded bitstreams have been scheduled by the multiplexer (see col. 5 lines 52-56).

instruction for allocating additional packets from the multiple transcoded bitstreams to the available bandwidth on the channel after the multiple transcoded bitstreams have been scheduled by the multiplexer, and if not, to not allocate additional packets from the multiple transcoded bitstreams in the bandwidth that is available after the multiple transcoded bitstreams have been scheduled by the multiplexer (if spare bandwidth is available, QLP allocating the spare bandwidth, see col. 5 lines 52-56; see col. 5 lines 5-9); and

instruction for transmitting data packets from each of the multiple transcoded bitstream onto the channel (see col. 5 lines 14-19; and see figure 1).

Response to Arguments

Applicant's arguments filed 1/29/2007 have been fully considered but they are not persuasive.

In response to the applicant's argument in pages 6 and 7, the process of "transcoding" is known in the art also as "encoding" the data. The term "**encoding" is** decribes by *wikipedia*[1] as a process of transforming information from one format into

[1] See en.wikipedia.org

another, and the term "transcoding" is decribes as the direct digital-to-digital conversion from one (usually lossy) codec to another. It involves decoding/decompressing the original data to a raw intermediate format (i.e. PCM for audio or YUV for video), in a way that mimics standard playback of the lossy content, and then re-encoding this into the target format.

WU discloses each TSP #1-#N performs encoding and compressing the incoming signal according to a specific quantization level (see col. 1 lines 20-27; and col. 4 lines 16-26). Therefore, *WU* discloses each TSP #1-#N performs transcoding function on the incoming signals.

In response to the applicant's argument in page 7, *WU* discloses the opportunistic data allows various types of data to be carried in the spare bandwidth of a digital transport stream (see col. 2 lines 7-8). The opportunistic data could be related to the data from sources #1-#N (see col. 5 lines 5-9). Therfore, *WU* discloses allocating the spare bandwidth to the multiple transcoded bitstreams.

In response to the applicant's argument, the amended claims subject matters fail to further limit the claims. *WU*'s statistical multiplexing will not allocate if no spare bandwidth is not available.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any response to this action should be mailed to:

The following address mail to be delivered by the United States Postal Service (USPS) only:

Mail Stop _____
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(571) 273-8300, (for formal communications intended for entry)

Or:

The following address mail to be delivered by other delivery services (Federal Express (Fed Ex), UPS, DHL, Laser, Action, Purolater, Hand Delivery, etc.) as follow:

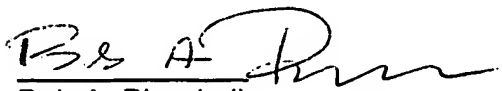
U.S. Patent and Trademark Office
220 20th Street South
Customer Window, Mail Stop _____

Crystal Plaza Two, Lobby, Room 1B03
Arlington, VA 22202.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Bob A. Phunkulh** whose telephone number is **(571) 272-3083.** The examiner can normally be reached on Monday-Tursday from 8:00 A.M. to 5:00 P.M. (first week of the bi-week) and Monday-Friday (for second week of the bi-week).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor **Wellington Chin**, can be reach on **(571) 272-3134.** The fax phone number for this group is **(571) 273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Bob A. Phunkulh
Primary Examiner
TC 2600
Technology Division 2616
April 16, 2006